National Institute of Environmental Health Sciences

Changes in weather and the effects on pediatric asthma exacerbations

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Abstract:

BACKGROUND: Pediatric asthma exacerbations may correlate with changes in weather, yet this relationship is not well defined. OBJECTIVE: To determine the effects of fluctuations in climatic factors (temperature, humidity, and barometric pressure) on pediatric asthma exacerbations. METHODS: A retrospective study was performed at 1 large urban hospital during a 2-year period (January 1, 2004, to December 31, 2005). Children presenting to the emergency department (ED) for an asthma exacerbation were included. Data on climactic factors, pollutants, and aeroallergens were collected daily. The relationship of daily (intraday) or between-day (interday) changes in climactic factors and asthma ED visits was evaluated using time series analysis, controlling for seasonality, air pollution, and aeroallergen exposure. The effects of climactic factors were evaluated on the day of admission (TEuro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin)0) and up to 5 days before admission (T-5 through T-1). RESULTS: There were 25,401 asthma ED visits. A 10% intraday increase in humidity on day T-1 or day T-2 was associated with approximately 1 additional ED visit for asthma (P < .001 and P Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) .01, respectively). Interday changes in humidity from day T - 3 to T-2 were also associated with more ED visits (P < .001). Interday changes in temperature from T-1 to T Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0 increased ED visits, with a 10 degrees F increase being associated with 1.8 additional visits (P Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) .006). No association was found with changes in barometric pressure. CONCLUSION: Fluctuations in humidity and temperature, but not barometric pressure, appear to influence ED visits for pediatric asthma. The additional ED visits occur 1 to 2 days after the fluctuation.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Meteorological Factors

Air Pollution: Allergens, Interaction with Temperature, Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): NO2, SO2, CO

Geographic Feature: ☑

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Respiratory Effect

Respiratory Effect: Asthma

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified